

**ABSTRACT OF THE DISCLOSURE**

A method includes providing a wafer having a first grating structure and a second grating structure formed in a photoresist layer. At least a portion of the first and second grating structures is illuminated with a light source. Light reflected from the illuminated portion of the first and second grating structures is measured to generate a reflection profile. Misregistration between the first and second grating structures is determined based on the reflection profile. A processing line includes a photolithography stepper, a metrology tool, and a controller. The photolithography stepper is adapted to process wafers in accordance with an operating recipe. The metrology tool is adapted to receive a wafer processed in the stepper. The wafer has a first grating structure and a second grating structure formed in a photoresist layer. The metrology tool includes a light source, a detector, and a data processing unit. The light source is adapted to illuminate at least a portion of the first and second grating structures. The detector is adapted to measure light reflected from the illuminated portion of the first and second grating structures to generate a reflection profile. The data processing unit is adapted to determine misregistration between the first and second grating structures based on the reflection profile. The controller is adapted to determine at least one parameter of the operating recipe of the photolithography stepper based on the determined misregistration.